

Base Operations Requirements Generation Process

Using

**Standard Service
Costing**

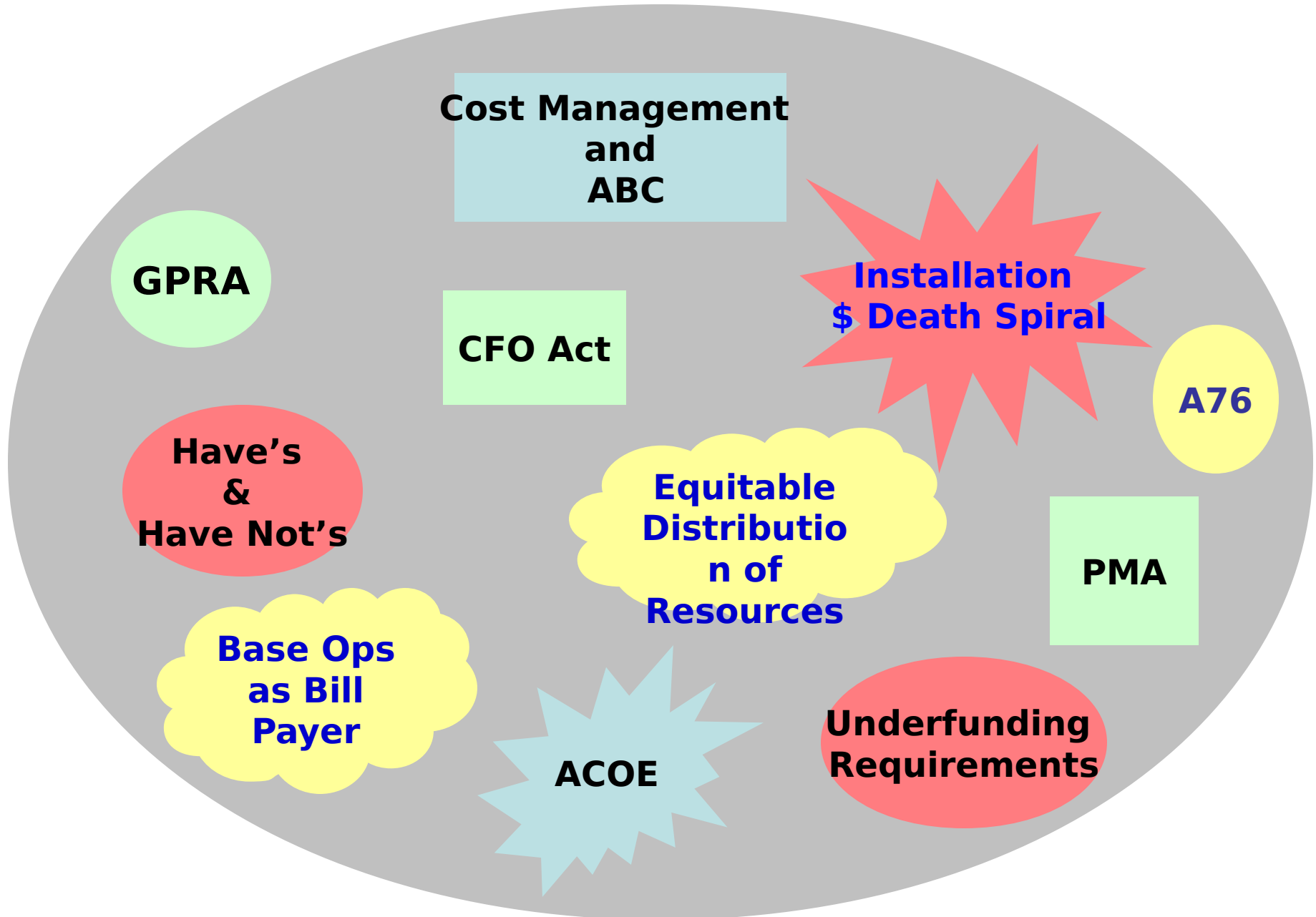
Steve Barth
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Agenda

- **Why Standard Service Costing?**
- Requirements Generation Process
 - Service Based Costing & Installation Status Report
 - Standard Service Costing
 - Base Operations Requirements
- Food Services Analysis

Base Operation Operating Environment



Why Standard Service Costing

- Standard Service Costing (SSC):

A **Methodology** Used to Develop **Predictive** Cost Equations to Estimate What a Service “**Should**” **Cost** Based on “**Performance Standards**”.

- Why:

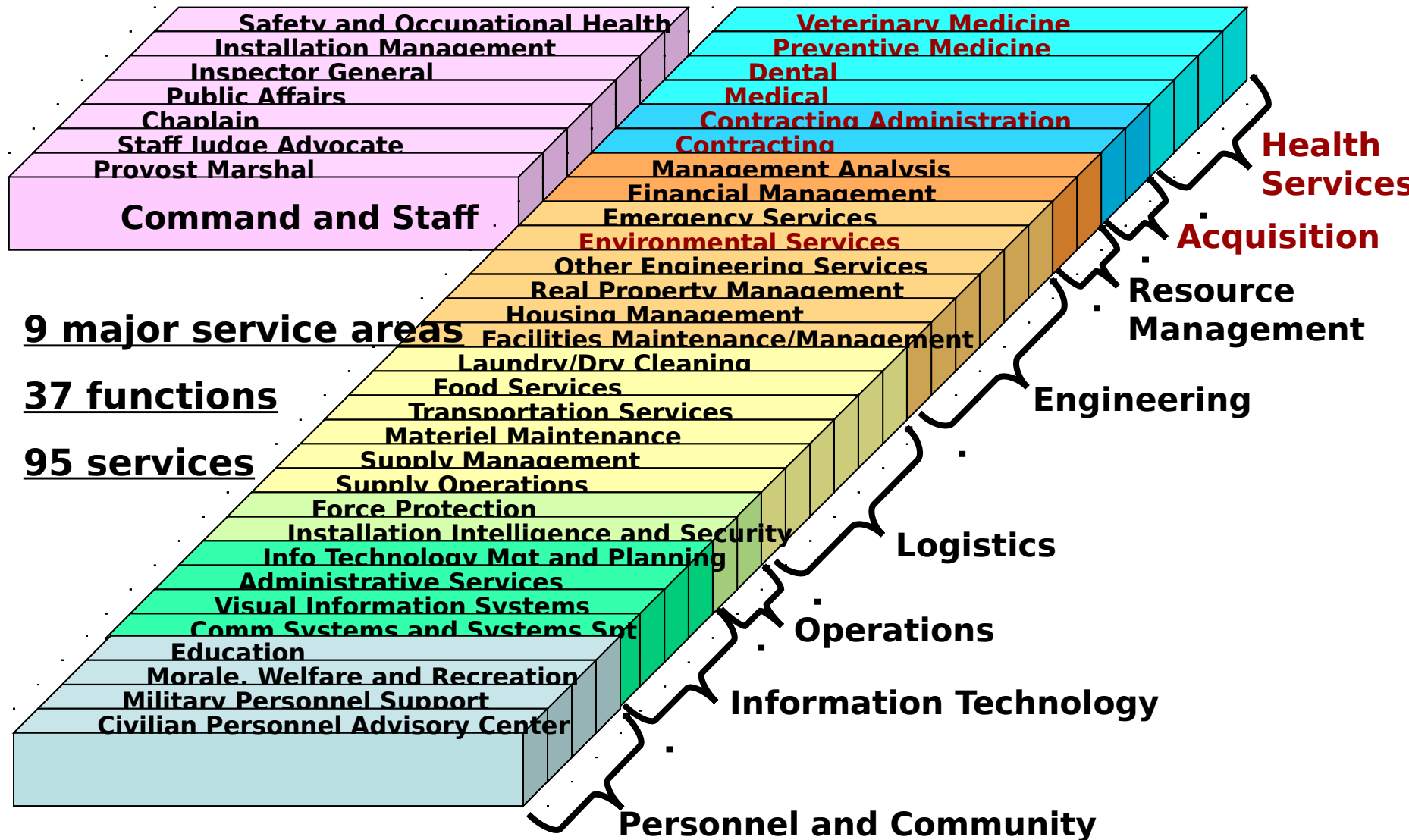
- Build Requirements Based on Performance Standards to Ensure:
 - ✓ Soldiers & Families get Quality Support
 - ✓ Consistent, Standard Support Across all Installations
 - ✓ Enable Well Being and Readiness
- Better Define, Develop, Justify & Defend Requirements by Service
- Articulate Impact of Funding Shortfalls

- Functional Proponents Involvement:

- Establish Accurate Performance Standards that Reflect Army Needs
- Monitor Installation Performance / Review Standards and Metrics
- Feedback & Support Through Annual After Action Reviews

Service Based Costing [SBC]

What Installations Do



History of Service Structure Development

- **Financial Accounting Records were Structured by Letter Account**

(Input Based, Non-Descriptive, Not Tied to Output)

- **DASA-CES Partnered with ACSIM to Develop a Performance Based Costing Methodology**

“What Do Base Operations (Installations) Produce for Soldiers, Families, and Units?”

- **DASA-CES conducted the following efforts which took 2 ½ Years to Agree on Taxonomy of Services**

- ✓ 1994 - FORSCOM Field Operational Assessment Defined 122 Services

- ✓ 1995 - AMC Baseline Service Study Increased to 132 Services

- ✓ 1995 - HQDA Service Proponents & MACOMS Finalized on 95 Services

- **Began Collecting Historical Cost and Output (e.g. # of Meals) Through Service Based Costing Across the Army in FY96**

SSC Cost Methodology

Using Pacing Measures (Drivers) to Predict Outcome

Drivers Can be Used to Predict 100% of an Outcome but Don't Explain All That is Done

Goal is to Use Drivers that Provide the Most Accuracy, 100% is Rarely Achieved



Outcome

Win or Lose Game

Driver

Total Offensive Yards per Game

Performance

Standards

- 150 Rushing Yds/ Game
- 2:1 Turnover Ratio
- 75% Field Goal Percentage



Outcome

Total Operating Cost

Driver

of Rooms Available & % Occupancy Rate

Performance

Standards

- Rooms Turned Over within 2 Hrs after Check Out IAW Hotel Checklist Criteria
- 30 Min Response to Calls
- 10 Min Check In & Out

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- **Requirements Generation Process**
 - Service Based Costing & Installation Status Report
 - Standard Service Costing
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BASOPS Requirements Generation Process

Standard Service Costing (SSC) Concept

Installation Status
Report (ISR) -
Services



Builds Installation
Baseline Service
Requirement

Results:

- Performance
- Cost



+

**HQDA
Approved
Adjustmen
ts**

Cost of Service at Performance
Standard

- Parametric Approach based on Pacing Measures (Cost Drivers)
- Predicts Full Service Cost

**Measures
Historical Cost
and Output**

Standard Service Costing (SSC)

Process

SBC Data Collection

Top load &
Installation
Inputs

Normalize Data

Foreign Currencies
Inflation
Regional Adjustments
Pay Raises

Denormalize Results

Reimbursement &
Other Appropriations
Military & Foreign Labor
Regional & Inflation

IRS Level of Performance

Green, Amber, Red

Statistical Analysis "Process"

Analyze Data
Scatter Plots
Correlation
Multiple Regression
Trend, Pattern, Data Mining, etc.

Data from the World



Searching for the Best Estimator

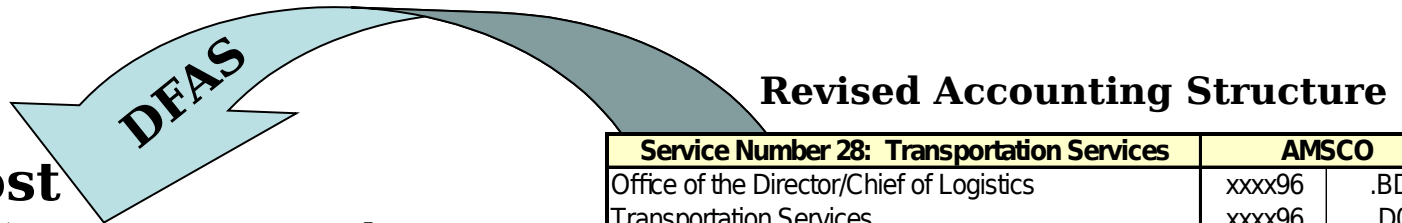


Validation

Compare Current CER Results with :
Previous CERs
Recent Obligations
Previous Requirements

Measurement of Full Cost & Performance

Historical Cost & Output [SBC]



• Full Cost

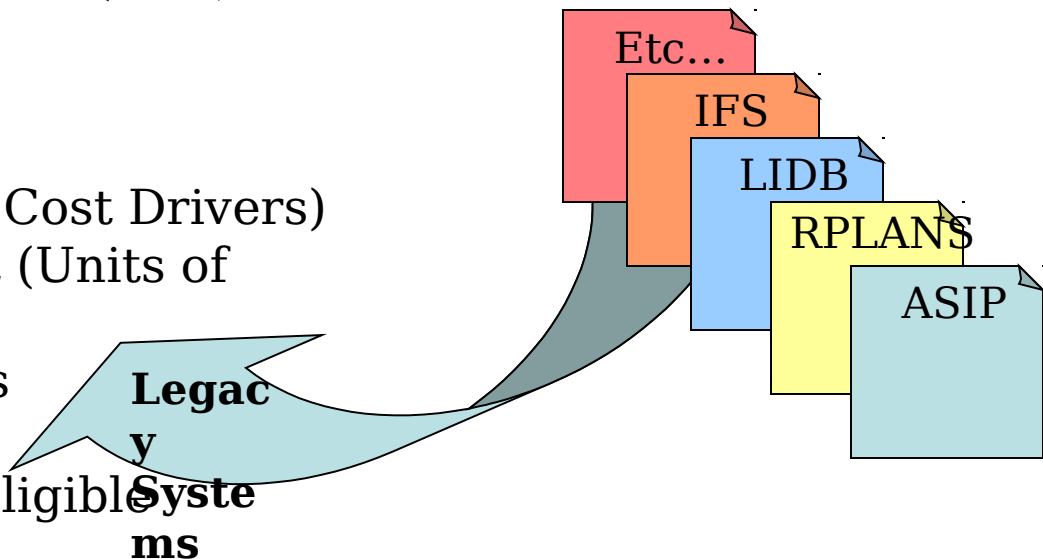
- OMA (Direct & Reimbursement)
- Military Labor (TDA, BMMP)
- NAF / APF Shortfalls
- Foreign National Labor
- Other Appropriations (DHP, AWCF, ..)



Service Number 28: Transportation Services	AMSCO	
Office of the Director/Chief of Logistics	xxxx96	.BD
Transportation Services	xxxx96	.D0
Non-GSA Transportation Motor Services	xxxx96	.DA
Installation Transportation Office Operations	xxxx96	.DB
GSA-Owned and Leased Transportation	xxxx96	.DC
Movement of Privately-Owned Personal Property	xxxx96	.DD
Supply Operations and Management	xxxx96	.B0

• Output

- Pacing Measures (Cost Drivers) used to Gauge Cost (Units of Measure)
 - ✓ # of Vehicles
 - ✓ # of Meals
 - ✓ Population Eligible



Service Based Costing (SBC) Provides Historical Cost and Output

BY SERVICE	BY INSTALLATION	
	CIVILIAN MANPOWER DATA	APF FTEs
		NAF FTEs
	ELEMENTS OF COST DATA	\$ Civilian Labor
		\$ Equipment
		\$ Materials
		\$ Contracts
		\$ Travel
		\$ Other
		\$ Depreciation
	MILITARY MANPOWER DATA	Military FTEs
	PACING MEASURES VALUES	Primary (PPM) Quantity
		Secondary (SPM) Quantity
		Tertiary (TPM) Quantity
	DEMOGRAPHIC DATA	IMA Region
		MACOM
		CONUS / OCONUS
		Carrier Appropriation (Funding Type)
		Civilian Employees
		Military
		Full Time Contractors
		Total Workforce
		Acres of Improved Grounds
		Acres of Unimproved Grounds
		Total Acres
		Lane Miles of Surfaced Roads
		Building KSF
		AFH Units
		Billet Spaces

Installation Service Level Performance

Performance Standards



Food Services Example

Installation Status Report (ISR) - Services

Performance Measure Description (Metric)	Green (Standard)	Amber (Standard)	Red (Standard)
Number of meals per week	21 down to 19	19 down to 16	Less than 16
Average annual food safety and protection score	100% down to 90%	Less than 90% down to 80%	Less than 80%
Percentage of meal card holders using the dining facilities	100% down to 65%	Less than 65% down to 50%	Less than 50%
Operating Costs/Food Costs	0.3% or less	More than 0.3% up to 0.4%	More than 0.4%

- **Performance measures at Green, Amber, Red Standards**

SBC Data *Normalization*

	<i>Inflation</i>	<i>Regional Adjustments</i>	<i>Pay Raise</i>	<i>Foreign Currency</i>
<i>Convert From</i>	Non-pay Current Yr \$	Local Pay - Regional Constructio n Rate	Civilian Pay \$	Local Currency
<i>Convert To</i>	Constant Yr \$	Standard Rate - National Standard	Base Yr Pay \$	U.S. Base Yr \$
<i>Using</i>	OSD Inflation Rates	Locality Pay Rate - Regional Constructio n Index	Civilian Pay Raise Adjustmen t	Budget Exchang e Rates

Normalization is necessary prior to analysis in order to remove regional anomalies and give each dollar the same buying power for a particular base year. Specifically, SBC Costs are adjusted for the following four factors:

- Inflation
- Regional Adjustments – Locality Pay and Regional Construction
- Pay Raise
- Foreign Currency Budget Exchange Rate



Full Cost and Performance Data



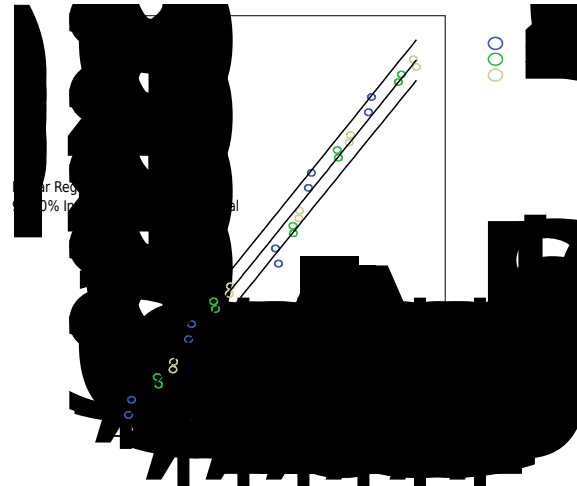
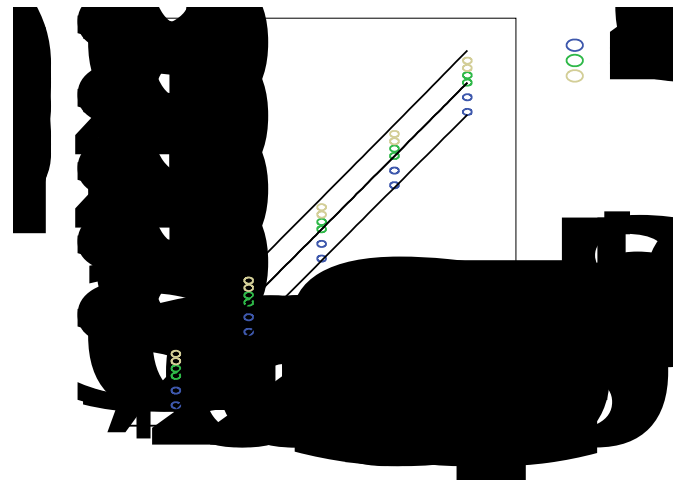
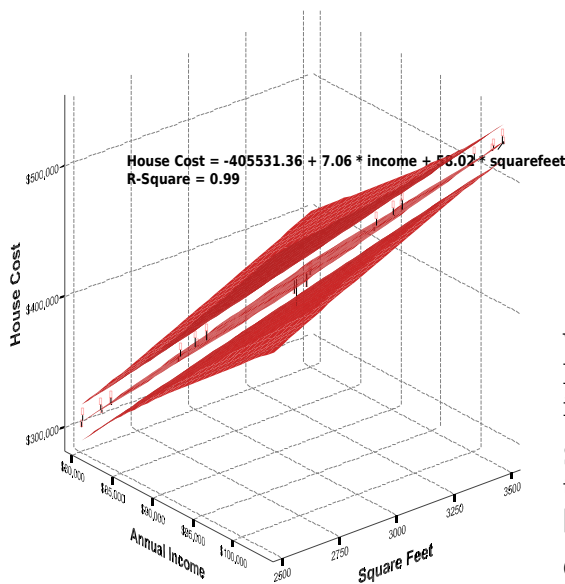
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2003	NORTHWEST	Fort Leonard Wood	\$20,312,057	9,013,330	22,719	25,056	16,068	C-4
2001	NORTHWEST	Fort Leonard Wood	\$11,347,071	8,697,189	18,445	20,667	15,389	C-4
2002	NORTHWEST	Fort Leonard Wood	\$15,200,148	8,353,232	21,170	23,466	17,002	C-4
2002	KOREA	Area I Support Activity	\$8,163,180	6,585,677	16,847	18,570	29,531	C-1
2003	SOUTHEAST	Fort Knox	\$16,002,891	5,985,808	15,001	17,008	13,974	C-1
2002	SOUTHEAST	Fort Knox	\$10,188,233	5,213,695	14,801	16,803	13,510	C-2
2002	SOUTHWEST	Fort Sill	\$7,276,556	5,100,262	17,319	19,931	10,631	N/A
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2003	NORTHWEST	Fort Lewis	\$5,154,050	3,176,391	19,731	23,238	16,205	C-4
2002	SOUTHWEST	Fort Hood	\$7,206,812	2,876,344	37,338	42,721	19,040	C-1
2001	NORTHEAST	Fort Lee	\$5,168,010	2,787,772	7,529	9,393	4,431	C-4
2003	SOUTHWEST	Fort Hood	\$6,844,703	2,757,140	36,880	42,158	18,988	C-1
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2001	NORTHWEST	Fort Lewis	\$5,306,215	2,454,128	18,299	21,701	14,770	C-4
2003	SOUTHWEST	Fort Sam Houston	\$6,460,003	2,335,948	12,301	16,206	6,738	C-1

Analyze Data

Scatter Plots

Primary Statistical Method is Regression however may use other widely accepted statistical methods as pertinent

E.g. Regression Model versus Model of the Mean --- Best Predictor



Which method (CER or 3 year average) does a better job predicting total service cost for each installation.

Subtract each installations predicted cost from the actual reported cost and square and sum [Sum of Squares Errors (SS)]

Calculate the Mean Squared Error (MSE) by dividing by the number of installations.

To convert back to dollars we take the square root of the MSE equaling the Root Mean Squared Error (RMSE).

Compare the CER estimate of the RMSE

House	Year	Cost	Square Feet	Income
1	2001	\$300,000	2500	\$80,000
1	2002	\$320,000	2500	\$82,500
1	2003	\$335,000	2500	\$83,750
2	2001	\$350,000	2750	\$85,000
2	2002	\$370,000	2750	\$87,250
2	2003	\$385,000	2750	\$88,500
3	2001	\$400,000	3000	\$92,500
3	2002	\$420,000	3000	\$93,750
3	2003	\$435,000	3000	\$94,250
4	2001	\$450,000	3250	\$95,000
4	2002	\$470,000	3250	\$97,500
4	2003	\$485,000	3250	\$98,500
5	2001	\$500,000	3500	\$100,000
5	2002	\$520,000	3500	\$102,500
5	2003	\$535,000	3500	\$103,750
6	2001	\$310,000	2500	\$80,250
6	2002	\$325,000	2500	\$82,400
6	2003	\$330,000	2500	\$83,700
7	2001	\$360,000	2750	\$85,250
7	2002	\$375,000	2750	\$87,100
7	2003	\$380,000	2750	\$88,400
8	2001	\$410,000	3000	\$92,250
8	2002	\$425,000	3000	\$93,700
8	2003	\$430,000	3000	\$94,200
9	2001	\$460,000	3250	\$95,250
9	2002	\$475,000	3250	\$97,400
9	2003	\$480,000	3250	\$98,400
10	2001	\$510,000	3500	\$100,250
10	2002	\$525,000	3500	\$102,750
10	2003	\$530,000	3500	\$104,000

$$SS_{pred} = \sum_{i=1}^N (y_i - \hat{y}_i)^2 \quad MSE_{pred} = \frac{SS_{pred}}{N}$$
$$= \sqrt{MSE_{pred}}$$



Baseline Requirements (OMA\$)

Generation Process

Step 1: Army “Full” Cost Equations by Service (SSC) by Installation

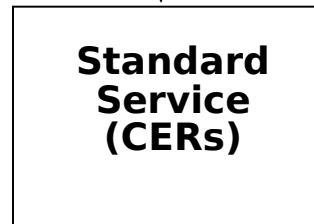
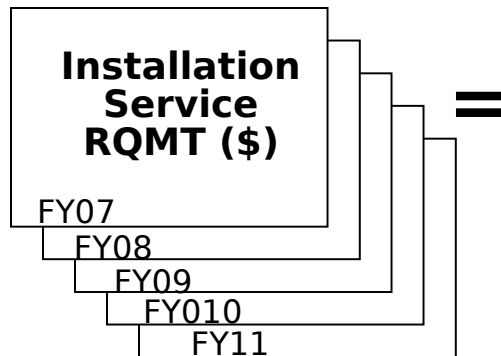
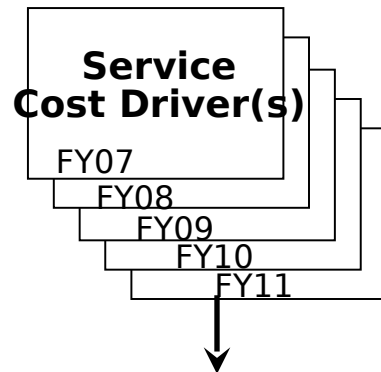
Step 2: Adjust for:

- ✓ Locality (Regional / Installation)
- ✓ Non OMA Labor (TDA Military, NAF, Local Nationals)
- ✓ Non OMA Funded Appropriations or \$ (DHP, AWCF, Reimbursements)
- ✓ Foreign Currency Fluctuation
- ✓ Inflation, Pay Raises

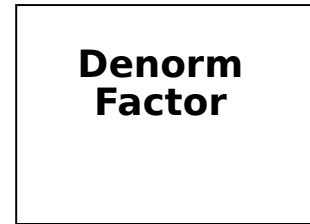
Step 3: Calculate Overall Army BASOPS (OMA\$)
Requirement by Service by Installation

BASOPS Requirements Development

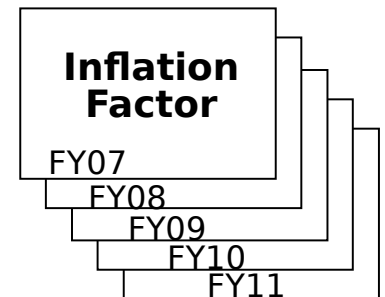
Using the AIM-HI SSC Model



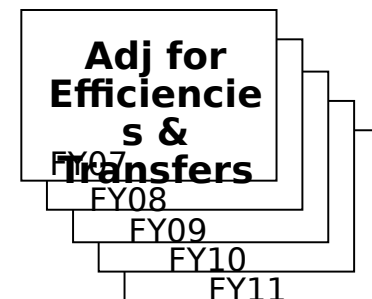
X



X



+



Total Installation BASOPS requirement is the sum of all service requirements for that Installation.

- ◆ Anti-terrorism/Force Protection High Risk Targets
- ◆ New Parents Support Program
- ◆ Utilities Modernization
- ◆ Reduction in Leased Space
- ◆ Dispose/Demolish Excess Facilities

Requirements Generation

Service Level POM / Budget Output

Baseline Services Requirement
(All at Green Standard)

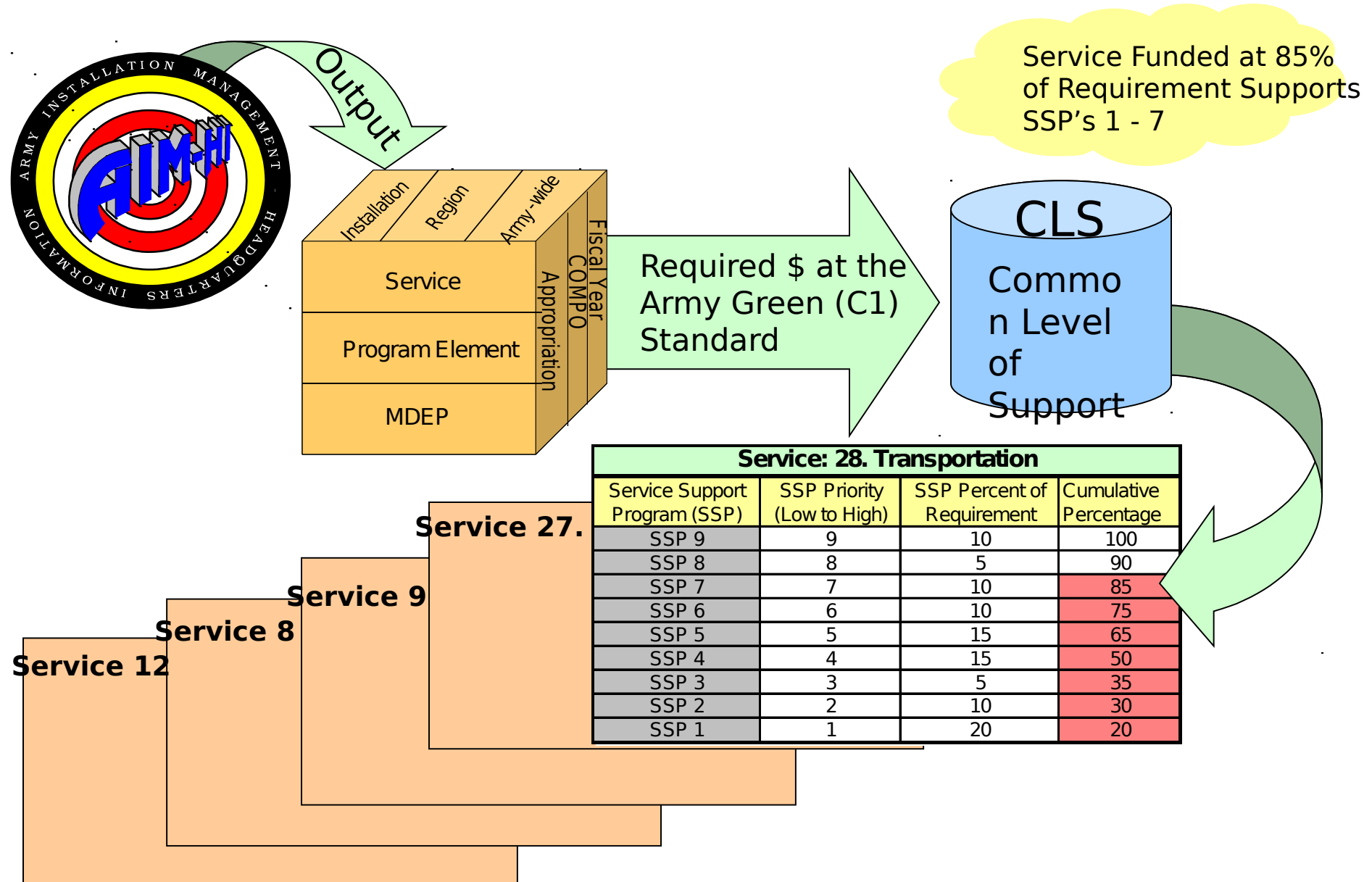
SERVICE
12. Fitness, Recreation and Libraries
22. Force Protection Services
23. Ammunition Supply Services
26. Asset Management
27. Materiel Support Maintenance
28. Transportation Services
29. Food Services
30. Laundry & Dry Cleaning Services
40. Maint. - Improved Grounds
41. Maint. - Unimproved Grounds (Other than Improv)
44. Heating/Cooling Services
47. Electrical Services
51. Army Lodging Management
52. UPH Management
58. Indoor Pest Control
61. Snow and Sand Removal
68. Fire and Emergency Response Services
69. Program/Budget
70. Support Agreement/MOU/MOA Management
79. Administrative & Civil Law
95. Installation Safety and Occupational Health

Funded at 85%
(Service Standards Vary)

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- Define and Develop Requirements by Service
- Defend and Justify Requirements
- Articulate Impact of Funding Shortfalls

Requirements to Funding to Common Level of Support

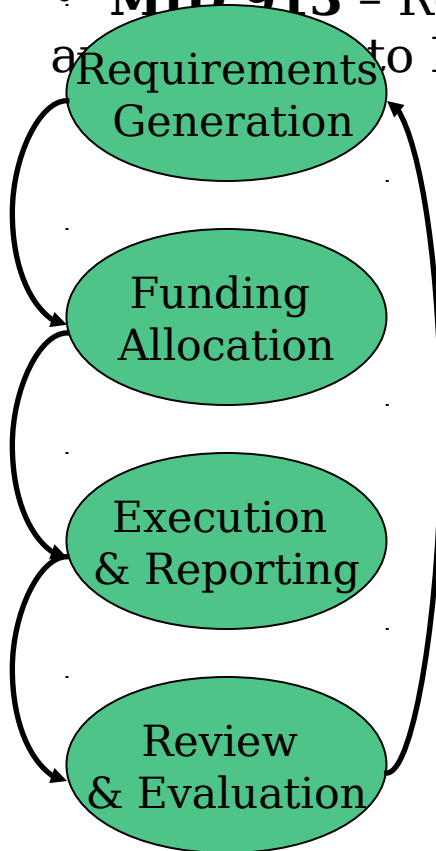


Support to Presidents Management Agenda

Management Initiative Decisions (MID)

- **MID 901** - Establish Performance Outcomes and Track Performance Results
- **MID 910** - DoD Components Must Associate Resource Requirements to Performance Metrics (60% in FY05, 80% in FY06, and 100% in FY07 Budgets)

- **MID 913** - Requires Performance Measures to be Incorporated at Requirements to Execution Review
- 80 - 90% of all Base Operations Requirements will be Generated Based on Performance Standards



- Funding to be Allocated to Installations to Achieve Common Levels of Support based on Resources Received

- Cost & Performance will be Measured by Services by Installation to Report How We Did with What We Spent

- Cost & Performance Reviews will Annually

Agenda

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- **Food Services Analysis**



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Installation Service Level Performance

Performance Standards



Food Services Example

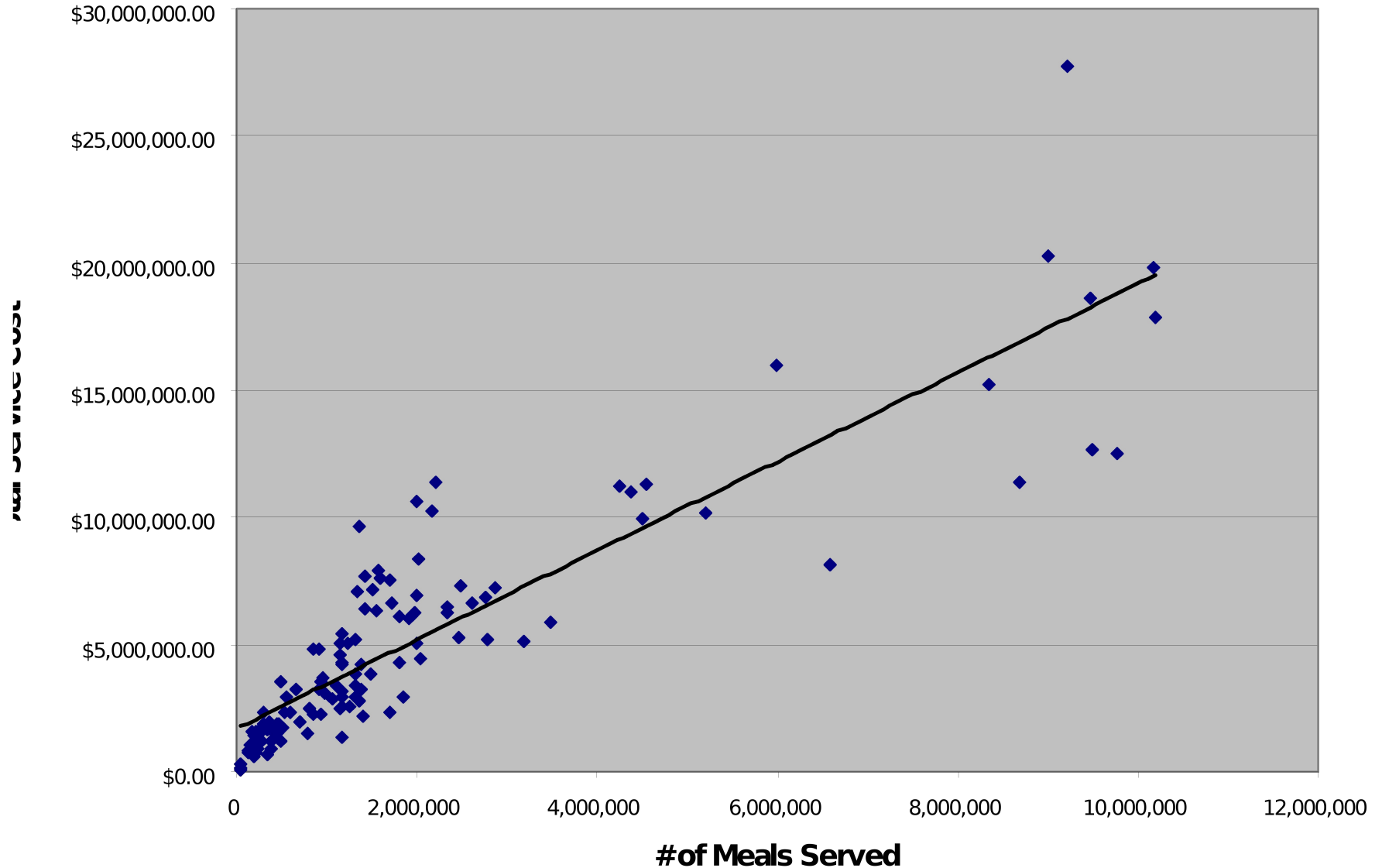
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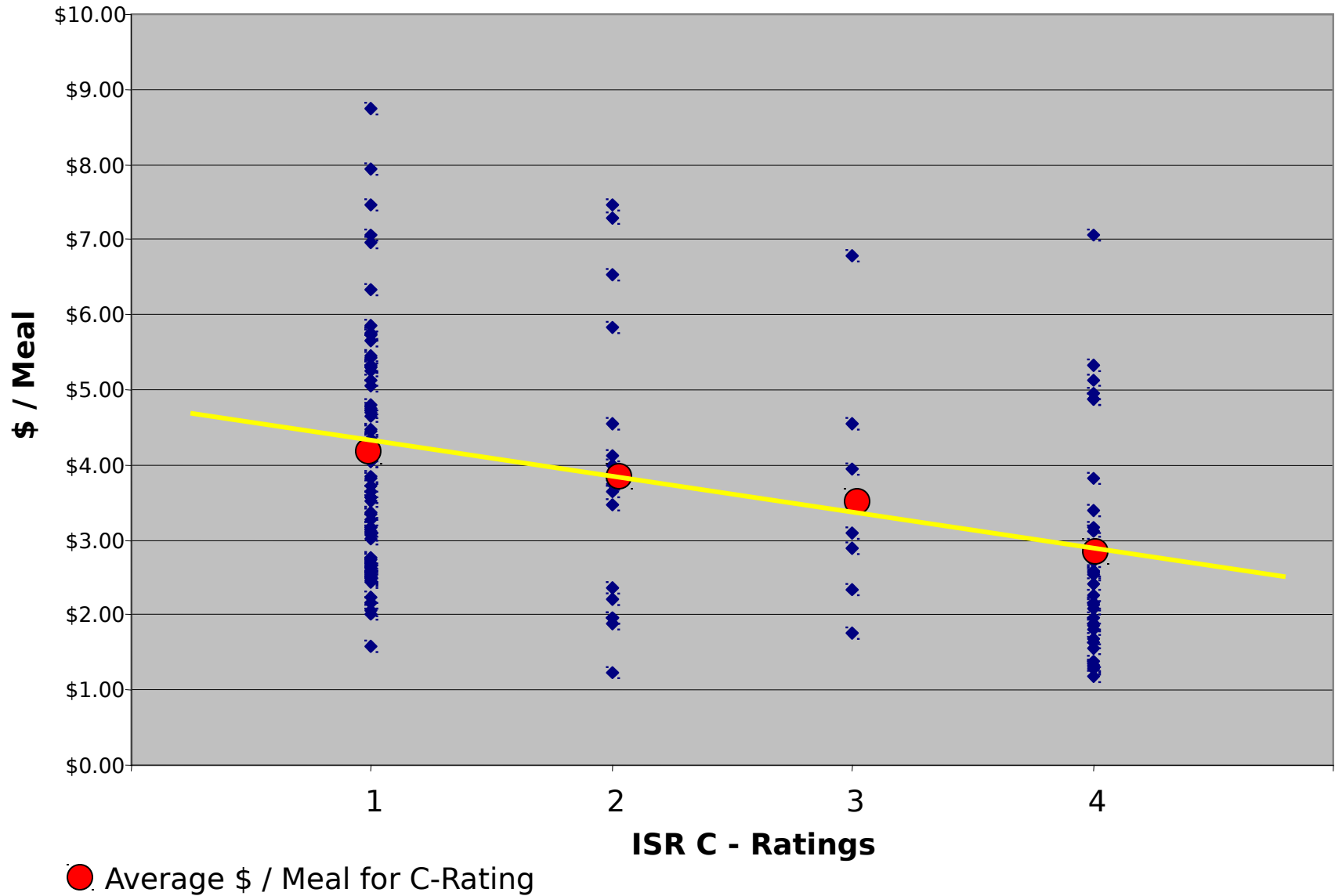
Service Cost per Unit - Active Army Installations FY01-

Food Services



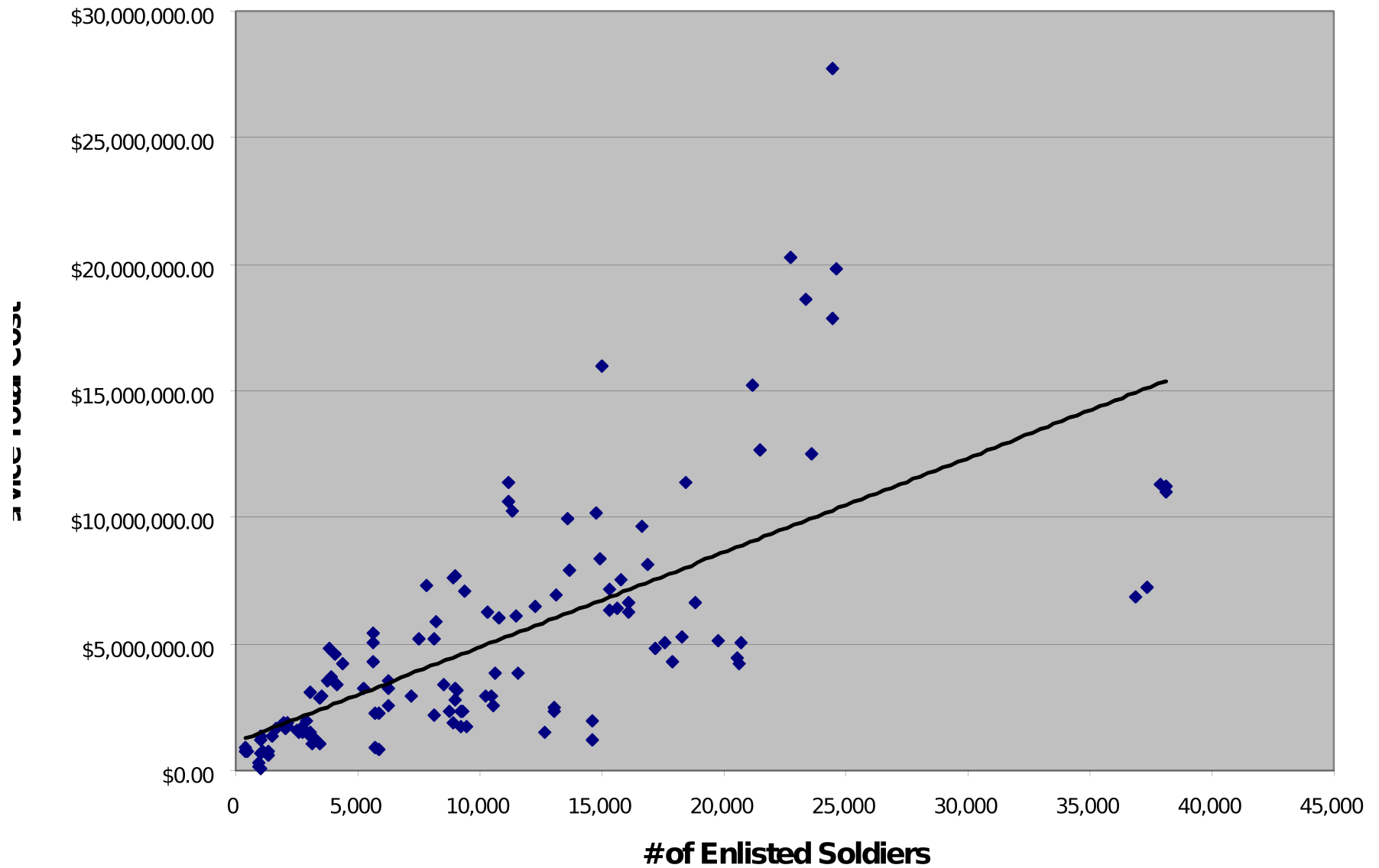
Service Cost & Performance

Food Services



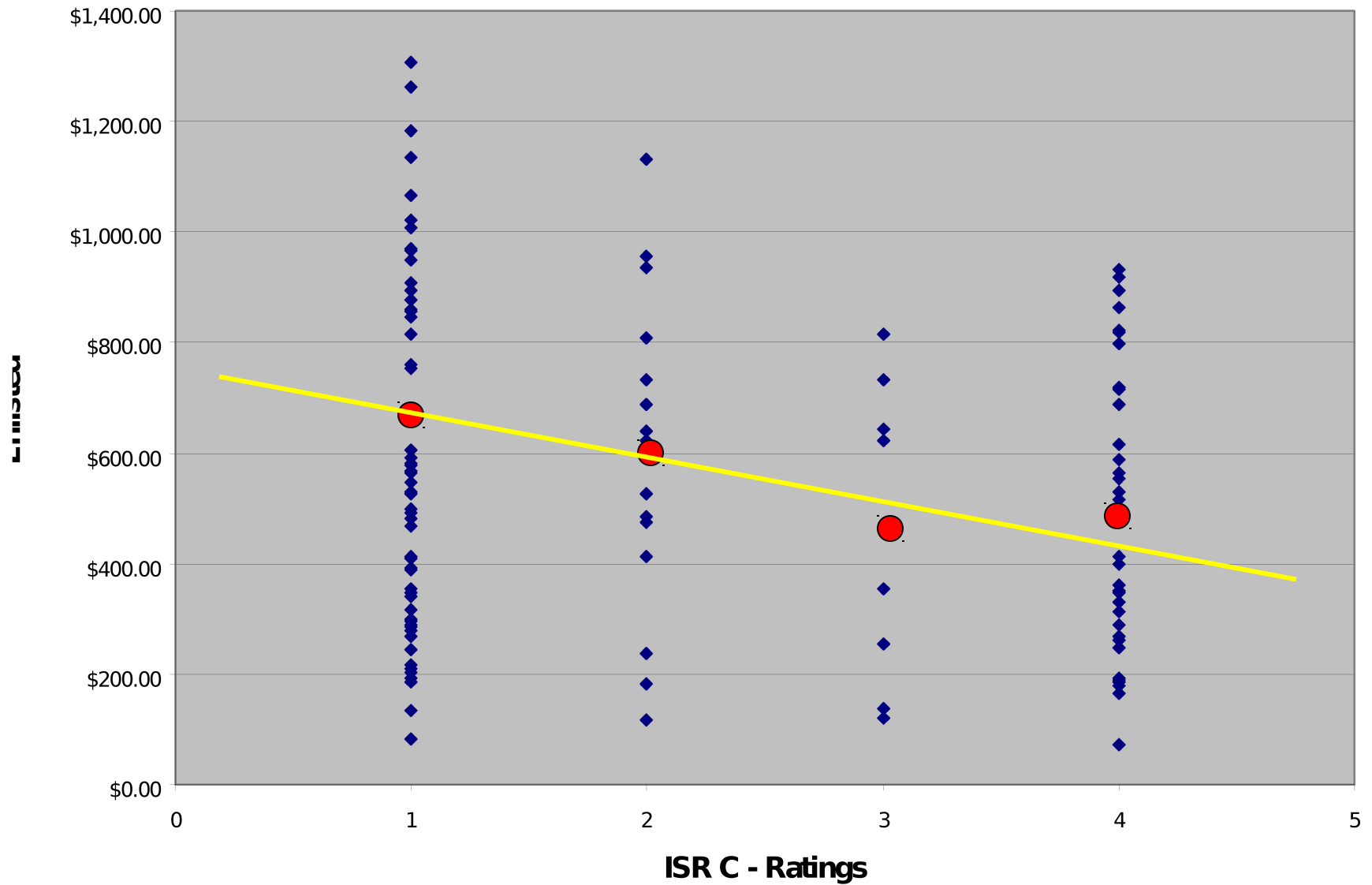
Service Cost per Unit - Active Army Installations FY01

Food Services



Service Cost & Performance

Food Services



● Average \$ / Enlisted Soldier for C-Rating

SSC Cost Methodology

Predicting Service Cost Linked to Performance Standards Food Services

➤ CONUS

■ Green $Y = \$918,397 + \$1.58(X_1) + \$3.63(X_1)$

■ Amber $Y = \$808,189 + \$1.39(X_1) + \$3.19(X_1)$

■ Red $Y = \$707,166 + \$1.22(X_1) + \$2.80(X_1)$

➤ Variables (Cost Drivers)

■ Y = Total Cost; X_1 = # Meals Served; X_2 = Enlisted Population

OCONUS

$Y = \$749,405 +$

$Y = \$659,476 +$

$Y = \$577,042 +$

**Drives
Total Cost
for
Service**

Performance Measures:

Performance Measure Description (Metric)	Green (Standard)
Number of meals per week	21 down to 19
Average annual food safety and protection score	100% down to 90%
Percentage of meal card holders using the dining facilities	100% down to 65%
Operating Costs/Food Costs	0.3% or less

Statistics:

CONUS -

■ **Adjusted R^2 = 87%**

■ **CoV = 46%**

OCONUS -

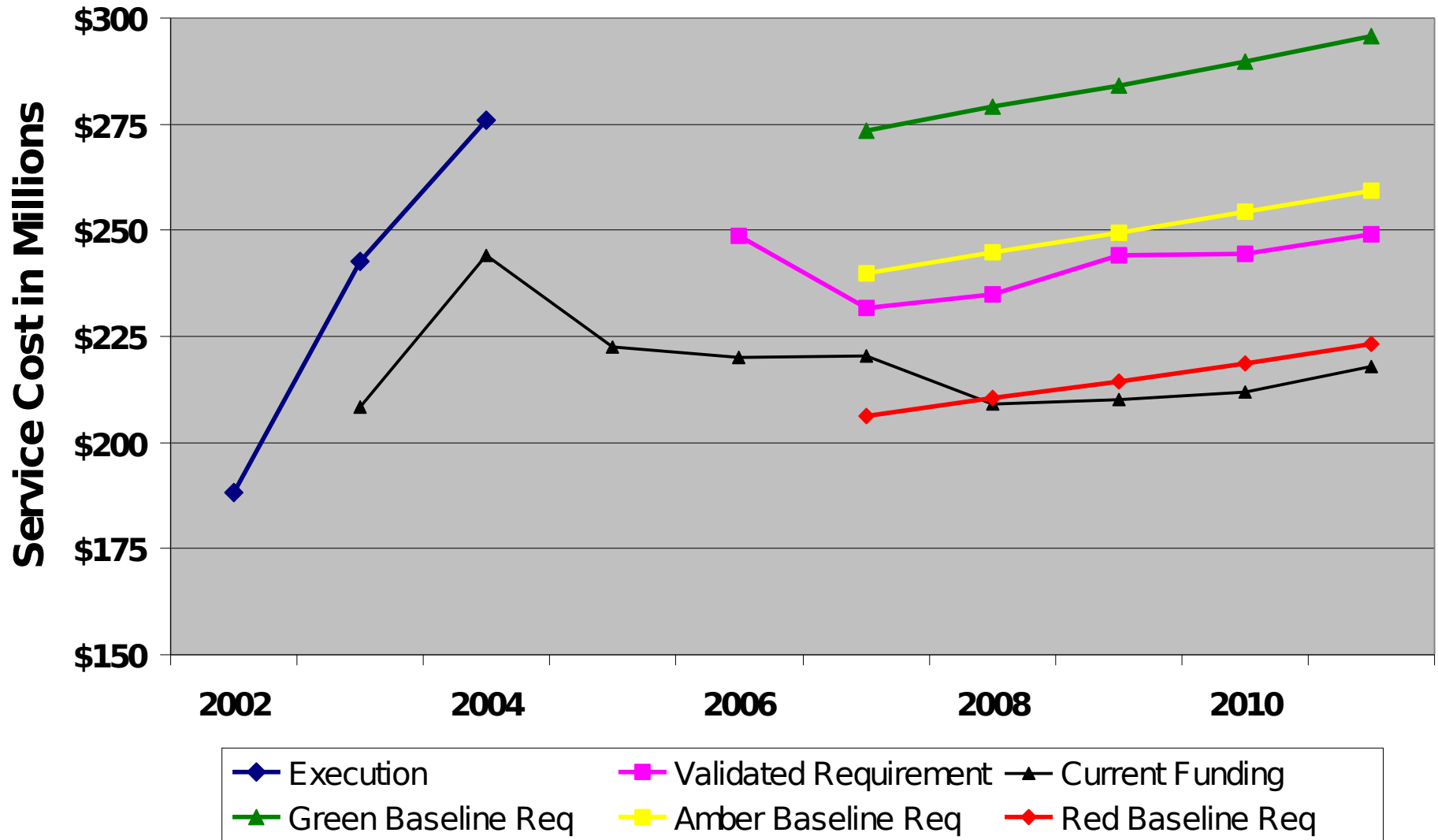
Adjusted R^2 = 89%

CoV = 22%

METRIC

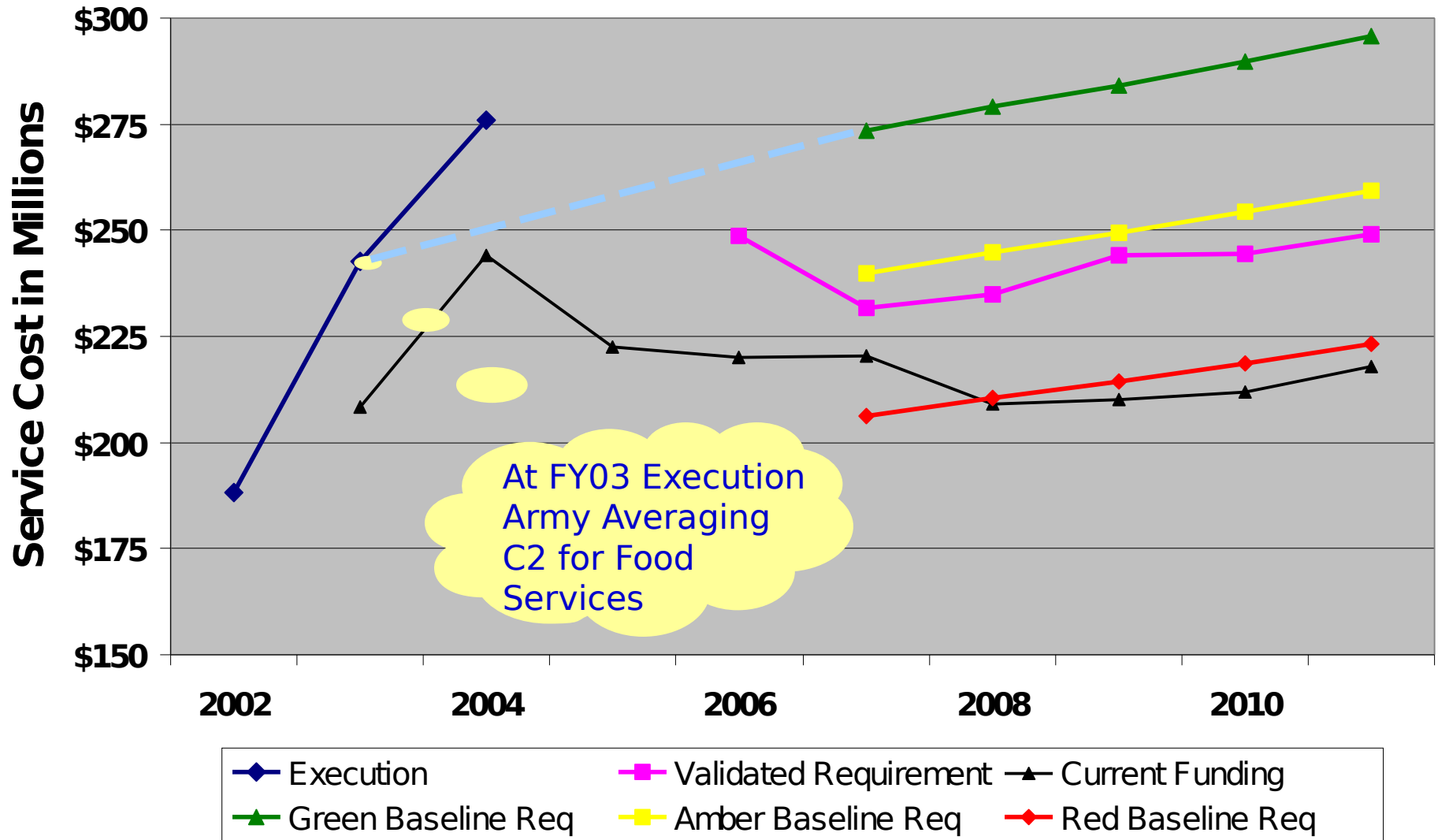
STANDARD

Food Services POM Outlook



Note: Execution Includes any GWOT Supplemental Spending

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